Pace Analytical Services, LLC
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

October 05, 2016

Meagan E. Ormand
Golder Associates Inc.
2108 W. Laburnum Ave.
Suite 200
Richmond, VA 23227

RE: Project: Bremo Weekly Process
Pace Project No.: 92314512

Dear Meagan Ormand:
Enclosed are the analytical results for sample(s) received by the laboratory on October 03, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nicole Gasiorowski

Nicole Gasiorowski
nicole.gasiorowski@pacelabs.com
Project Manager

Enclosures

cc: Ron DiFrancesco, Golder Associates Inc.
Martha Smith, Golder Associates Inc.
Mike Williams, Golder Associates Inc

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CERTIFICATIONS

Project: Bremo Weekly Process
Pace Project No.: 92314512

Ormond Beach Certification IDs

8 East Tower Circle, Ormond Beach, FL 32174
Alabama Certification #: 41320
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maryland Certification: #346
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
Nevada Certification: FL NELAC Reciprocity
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
Wyoming Certification: FL NELAC Reciprocity
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

Eden Certification IDs

205 East Meadow Road Suite A, Eden, NC 27288
North Carolina Drinking Water Certification #: 37738
North Carolina Wastewater Certification #: 633
Virginia/VELAP Certification #: 460025

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SAMPLE ANALYTE COUNT

Project: Bremo Weekly Process
Pace Project No.: 92314512

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92314512001	**T2-161003-0945-S3**	ASTM D4282-02	KCE	1	PASI-E
		EPA 200.7	CKJ	8	PASI-O

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Bremo Weekly Process
Pace Project No.: 92314512

Method: **ASTM D4282-02**
Description: Cyanide, Free
Client: Golder_Dominion_Bremo
Date: October 05, 2016

General Information:
1 sample was analyzed for ASTM D4282-02. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: Bremo Weekly Process
Pace Project No.: 92314512

Method: **EPA 200.7**
Description: 200.7 MET ICP
Client: Golder_Dominion_Bremo
Date: October 05, 2016

General Information:
1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 324323

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92314507001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1728841)
  - Barium
- MSD (Lab ID: 1728842)
  - Barium

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: Bremo Weekly Process
Pace Project No.: 92314512

Sample: T2-161003-0945-S3 **Lab ID: 92314512001** Collected: 10/03/16 09:45 Received: 10/03/16 12:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Cyanide, Free	Analytical Method: ASTM D4282-02							
Cyanide, Free	ND	mg/L	0.050	1		10/04/16 10:00	57-12-5	
200.7 MET ICP	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Aluminum	**198**	ug/L	100	1	10/04/16 13:44	10/04/16 17:34	7429-90-5	
Barium	**337**	ug/L	10.0	1	10/04/16 13:44	10/04/16 17:34	7440-39-3	
Beryllium	ND	ug/L	1.0	1	10/04/16 13:44	10/04/16 17:34	7440-41-7	
Boron	**1670**	ug/L	50.0	1	10/04/16 13:44	10/04/16 17:34	7440-42-8	
Cobalt	ND	ug/L	10.0	1	10/04/16 13:44	10/04/16 17:34	7440-48-4	
Iron	ND	ug/L	250	1	10/04/16 13:44	10/04/16 17:34	7439-89-6	
Molybdenum	**153**	ug/L	10.0	1	10/04/16 13:44	10/04/16 17:34	7439-98-7	
Vanadium	ND	ug/L	10.0	1	10/04/16 13:44	10/04/16 17:34	7440-62-2	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92314512

QC Batch: 331752
QC Batch Method: ASTM D4282-02
Associated Lab Samples: 92314512001

Analysis Method: ASTM D4282-02
Analysis Description: ASTM D4282 Free Cyanide

METHOD BLANK: 1837953 Matrix: Water
Associated Lab Samples: 92314512001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cyanide, Free	mg/L	ND	0.050	10/04/16 10:00	

LABORATORY CONTROL SAMPLE: 1837954

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cyanide, Free	mg/L	.1	0.10	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1837955 1837956

Parameter	Units	92314516002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Cyanide, Free	mg/L	ND	.1	.1	0.10	0.10	98	98	90-110	0	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: Bremo Weekly Process
Pace Project No.: 92314512

QC Batch: 324323
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 MET
Associated Lab Samples: 92314512001

METHOD BLANK: 1728839 Matrix: Water
Associated Lab Samples: 92314512001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	10/04/16 17:05	
Barium	ug/L	ND	10.0	10/04/16 17:05	
Beryllium	ug/L	ND	1.0	10/04/16 17:05	
Boron	ug/L	ND	50.0	10/04/16 17:05	
Cobalt	ug/L	ND	10.0	10/04/16 17:05	
Iron	ug/L	ND	250	10/04/16 17:05	
Molybdenum	ug/L	ND	10.0	10/04/16 17:05	
Vanadium	ug/L	ND	10.0	10/04/16 17:05	

LABORATORY CONTROL SAMPLE: 1728840

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	2500	2470	99	85-115	
Barium	ug/L	250	256	102	85-115	
Beryllium	ug/L	25	24.6	99	85-115	
Boron	ug/L	2500	2480	99	85-115	
Cobalt	ug/L	250	266	107	85-115	
Iron	ug/L	2500	2490	99	85-115	
Molybdenum	ug/L	250	259	104	85-115	
Vanadium	ug/L	250	254	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1728841 1728842

Parameter	Units	92314507001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Aluminum	ug/L	190	2500	2500	2570	2590	95	96	70-130	1	
Barium	ug/L	324	250	250	675	691	140	147	70-130	2	M1
Beryllium	ug/L	ND	25	25	24.2	25.2	97	101	70-130	4	
Boron	ug/L	1600	2500	2500	4180	4340	103	110	70-130	4	
Cobalt	ug/L	ND	250	250	250	257	100	103	70-130	2	
Iron	ug/L	ND	2500	2500	2530	2550	97	98	70-130	1	
Molybdenum	ug/L	147	250	250	436	451	116	121	70-130	3	
Vanadium	ug/L	ND	250	250	257	268	101	106	70-130	4	

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QUALIFIERS

Project: Bremo Weekly Process
Pace Project No.: 92314512

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-E	Pace Analytical Services - Eden
PASI-O	Pace Analytical Services - Ormond Beach

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Bremo Weekly Process
Pace Project No.: 92314512

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92314512001	**T2-161003-0945-S3**	ASTM D4282-02	331752		
92314512001	**T2-161003-0945-S3**	EPA 200.7	324323	EPA 200.7	324327

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Pace Analytical®	Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: May 24, 2016 Page 1 of 2
	Document No.: F-MEC-CS-009-Rev.03	Issuing Authority: Pace Mechanicsville Quality Office

Sample Condition Upon Receipt

Client Name: Golder/Bremo

Project #: WO# : 92314512

92314512

Courier: ☐ Commercial ☑ Pace ☐ Fed Ex ☐ UPS ☐ USPS ☐ Other:____ ☐ Client

Custody Seal Present? ☑ Yes ☐ No Seals Intact? ☑ Yes ☐ No

Date/Initials Person Examining Contents: 10-3-16 RSB

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:____

Thermometer: ☒ RMD001 ☐____ Type of Ice: ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Correction Factor: 0.0°C Cooler Temp Corrected (°C): 2.0 Biological Tissue Frozen? ☐ Yes ☐ No ☐ N/A

Temp should be above freezing to 6°C

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

				Comments/Discrepancy:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	2.
Short Hold Time Analysis (<72 hr.)?	☐ Yes	☑ No	☐ N/A	3.
Rush Turn Around Time Requested?	☑ Yes	☐ No	☐ N/A	4.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	5.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	6.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	7.
Samples Field Filtered?	☐ Yes	☐ No	☑ N/A	8. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	9.
-Includes Date/Time/ID/Analysis Matrix: WW				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	10. HNO3 pH<2; HCl pH<2; H2SO4 pH<2; NaOH pH>12; NaOH/ZnOAc pH>9
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg	☐ Yes	☐ No	☑ N/A	
Samples checked for dechlorination?	☐ Yes	☐ No	☑ N/A	11.
Headspace in VOA Vials (>5-6mm)?	☐ Yes	☐ No	☑ N/A	12.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	13.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):____				

CLIENT NOTIFICATION/RESOLUTION Field Data Required? ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Sample Discrepancy: _____

Project Manager SCURF Review: NMG **Date:** 10/4/16

Project Manager SRF Review: NMG **Date:** 10/4/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

00019483

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www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company:	Golder Associates
Address:	2108 W Laburnum Ave, Ste 200
	Richmond,VA 23227
Email To:	Mormand@golder.com
Phone: 804-551-0129	Fax: 804-358-2900
Requested Due Date/TAT:	~~24 HOUR~~ 3-Day

Section B Required Project Information:

Report To:	Mormand@golder.com
Copy To:	Martha_Smith@golder.com
	Ron_Difrancesco@golder.com
Purchase Order No.:	
Project Name:	Bremo Monthly Process
Project Number:	1520-347.200

Section C Invoice Information:

Attention:	Meagan Ormand
Company Name:	Golder Associates
Address:	gaiapdataentry_invoices@golder.com
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHE _____

Site Location STATE: VA

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: 200.7 - Al, Ba, Be, B, Co	200.7 - Fe, Mo, V	ASTM4282 - Free Cyanide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	T2-161003-0945-S3	WW	G	—	—	10/3/16	09:45		3			X		X				X	X	X		N	92314512 001
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
All analyses to be performed under Golder-Pace MSA dated 12/19/2008	Golder	10/3/16	1210	Defam	10/3/16	17:10				
		10/3/16	14:35	Rachel Burruss	10-3-16	1435	2.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: L. Hamelmann

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 10/03/16

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.